

14.3: Data and Analysis

Data Collection

- (Acquiring competencies) Following your detailed protocol based on the videos, perform all the experiments. Record your observations and take pictures of your key steps in the process. Your observations and images need to be incorporated in your data section and this section should be as detailed as possible as you will use this information to complete your discussion.
- (Representation) Make sure to collect all the data that is required to fill out this table as you work your way through the experiment. The volumes are suggested amounts, update those with your measured values.

Experiment number	Mass of tablet (g)	Mass of cup (g)	Volume of vinegar (mL)	Volume of water (mL)	Mass of cup with water and vinegar (g)	Mass of cup with water and vinegar + mass of tablet (g)	Mass of cup after experiment (g)	Mass lost during the experiment (g)
1			0	35				
2			5	30				
3			10	25				
4			15	20				
5			20	15				
6			25	10				
7			30	5				
8			35	0				

Data Processing

- (Existing knowledge, research, and views) List the ingredients contained in Alka-Seltzer and their amounts.
- (Representation) Write the chemical equation for the reaction that occurs when Alka-Seltzer dissolves in water.
- (Representation) Write the chemical equations for the reactions that occurs when Alka-Seltzer reacts with vinegar.
- (Manipulation) The mass lost during the experiment is the carbon dioxide gas that bubbled out of your solution. Using the mass of the carbon dioxide from the experiments and the chemical equations from questions 2 and 3, calculate the mass of the sodium bicarbonate in each tablet. (Hint: There will be 8 calculations.) Write each calculation with the appropriate units.
- (Manipulation) Using the previously calculated masses of sodium bicarbonate and the measured mass of each tablet, calculate the consumed sodium bicarbonate percentage of each tablet. (Hint: There will be 8 calculations.) Write each calculation with the appropriate units.
- (Representation) Organize your calculated values in the following table and plot the volume of vinegar on the x axis and the percent for the consumed mass of the tablet on the y axis.

Experiment number	Volume of vinegar (mL)	Mass of generated CO ₂ (g)	Mass of consumed NaHCO ₃ (g)	Consumed percentage of tablet (%)	NaHCO ₃
1	0				
2	5				
3	10				

Experiment number	Volume of vinegar (mL)	Mass of generated CO ₂ (g)	Mass of consumed NaHCO ₃ (g)	Consumed percentage of tablet (%)
4	15			
5	20			
6	25			
7	30			
8	35			

7. (Assumptions and Analysis) Fill in the following table using the observations and data from your experiments.

Assumptions made	Testing the assumption	If assumptions are wrong ...
There is sufficient water to dissolve all the sodium bicarbonate.	Dissolve the same tablet in a larger volume of water and compare the residue.	
The citric acid is the limiting reactant in the Alka-Seltzer tablet.		

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